Complete Summary

GUIDELINE TITLE

The diagnosis, treatment, and evaluation of the initial urinary tract infection in febrile infants and young children.

BIBLIOGRAPHIC SOURCE(S)

American Academy of Pediatrics (AAP). The diagnosis, treatment, and evaluation of the initial urinary tract infection in febrile infants and young children. Pediatrics 1999 Apr;103(4 Pt 1):843-52. [54 references] PubMed

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Urinary tract infection (UTI)

GUIDELINE CATEGORY

Diagnosis
Evaluation
Treatment

CLINICAL SPECIALTY

Emergency Medicine
Family Practice
Pediatrics

INTENDED USERS

Hospitals
Physicians

GUIDELINE OBJECTIVE(S)

To formulate recommendations for health care professionals about the diagnosis, treatment, and evaluation of an initial urinary tract infection (UTI) in febrile infants and young children (ages 2 months to 2 years).

TARGET POPULATION

Febrile infants and young children between the ages 2 months to 2 years

INTERVENTIONS AND PRACTICES CONSIDERED

- Recognition of the child at risk for urinary tract infection (UTI)
- Diagnosis of UTI, with history and physical examination, urinalysis, and culture
- Short-term treatment of UTI, with parenteral antimicrobial regimens (see Table 3 in original guideline), oral antimicrobial regimens (see Table 4 in original guideline), and prophylactic regimens (see Table 5 in original guideline)
- Imaging evaluation for possible urinary tract abnormality with ultrasound, voiding cystourethrography, or radionuclide cystography

MAJOR OUTCOMES CONSIDERED

- Effectiveness of treatment for acute infection, as determined by clinical response and/or bacteriologic response (culture results)
- Complications of recurrent infection including progressive renal scarring, chronic hypertension, renal failure and death

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Primary Sources)
Hand-searches of Published Literature (Secondary Sources)
Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Articles for review were obtained from four sources in two rounds of searching. In the first round, the MEDLINE database was searched using four separate search strategies corresponding with the four phases of the diagnosis and treatment of UTI: recognition, diagnosis, short-term treatment, and imaging evaluation.

In a second round of searching, articles were identified from three additional sources: the bibliographies of two recent reviews; literature recommended by the members of the Subcommittee; and articles sought specifically to estimate costs

for the management of chronic hypertension and end-stage renal disease (ESRD). At each of the two rounds of searching, the resulting articles were reviewed by the epidemiology consultant, and articles with no original data were removed.

NUMBER OF SOURCE DOCUMENTS

More than 2,000 titles were identified from MEDLINE and bibliographies of current review articles from 1966 to 1996, and the authors' files. Of these, 402 articles contained relevant original data that were abstracted in a formal, standardized manner.

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Subjective Review

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not applicable

METHODS USED TO ANALYZE THE EVIDENCE

Decision Analysis
Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Data from 402 articles were extracted and recorded in evidence tables, using an Excel (Microsoft Corporation, Redmond, WA) spreadsheet. A subset of 24 articles was reviewed twice by different reviewers to check interrater reliability. At the time of analysis of the decision models, the articles were reviewed again by the epidemiology consultant.

A conceptual evidence model of the diagnosis and management of urinary tract infection (UTI) was used to generate a decision tree. The comprehensive literature review determined the probability estimates used in the tree. The tree was then used to conduct risk analyses and cost-effectiveness analyses of alternative strategies for the diagnosis and management of UTI. Based on the results of these analyses and consensus when necessary, an algorithm representing the strategies with acceptable risk-benefit trade-offs was developed.

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

Not stated

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

The strength of evidence on which recommendations were based was rated by the Subcommittee methodologist as "strong," "good," "fair," or "opinion/consensus."

COST ANALYSIS

The cost-effectiveness analysis in the accompanying technical report was used to quantify the trade-offs between cost and clinical effect when moving from one clinical strategy to another. Cost-effectiveness analysis depicts the additional cost per unit of improvement in clinical effect. For this analysis, the units of effect were defined as cases of death, end-stage renal disease, or hypertension prevented.

Strategies were compared using the incremental (or marginal) cost-effectiveness ratio, ie, the difference in cost among strategies divided by the difference in effect.

The marginal cost-effectiveness was calculated for the diagnosis and treatment of urinary tract infection (UTI) and for imaging the urinary tracts of children with UTI. The optimal strategy depends on the decision-makers willingness to pay for each additional case prevented.

Based on the analysis, the Subcommittee concluded that for girls and uncircumcised boys, it is cost-effective to pursue the diagnosis of UTI by invasive means and to perform imaging studies of the urinary tract. For circumcised boys younger than 1 year, the cost-benefit ratio analysis is equivocal, but the Subcommittee supports the same diagnostic and evaluation measures as for girls and uncircumcised boys. Circumcised boys older than 1 year have a lower prevalence of UTI, and the prevalence of reflux is lower than that in those younger than 1 year. As a result, the cost-effectiveness analysis does not support invasive diagnostic procedures for all circumcised boys older than 1 year with unexplained fever. Analysis of a bag-collected specimen is a reasonable screening test in these boys, as long as they do not appear so ill as to warrant the initiation of antimicrobial therapy. Those who will be given antimicrobials on clinical grounds should have a specimen obtained for culture that is unlikely to be contaminated.

METHOD OF GUIDELINE VALIDATION

External Peer Review
Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

The Subcommittee, the American Academy of Pediatrics (AAP) Committee on Quality Improvement, a review panel of office-based practitioners, and other groups within and outside the AAP reviewed and revised the present guideline.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

I. DIAGNOSIS

Recommendation 1

The presence of urinary tract infection (UTI) should be considered in infants and young children 2 months to 2 years of age with unexplained fever (strength of evidence: strong).

Recommendation 2

In infants and young children 2 months to 2 years of age with unexplained fever, the degree of toxicity, dehydration, and ability to retain oral intake must be carefully assessed (strength of evidence: strong).

Recommendation 3

If an infant or young child 2 months-to-2 years of age with unexplained fever is assessed as being sufficiently ill to warrant immediate antimicrobial therapy, a urine specimen should be obtained by suprapubic aspiration (SPA) or transurethral bladder catheterization; the diagnosis of UTI cannot be established by a culture of urine collected in a bag (strength of evidence: good).

Recommendation 4

If an infant or young child 2 months to 2 years of age with unexplained fever is assessed as not being so ill as to require immediate antimicrobial therapy, there are two options (strength of evidence: good).

Option 1

Obtain and culture a urine specimen collected by SPA or transurethral bladder catheterization.

Option 2

Obtain a urine specimen by the most convenient means and perform a urinalysis. If the urinalysis suggests a UTI, obtain and culture a urine specimen collected by SPA or transurethral bladder catheterization; if urinalysis does not suggest a UTI, it is reasonable to follow the clinical course without initiating antimicrobial therapy, recognizing that a negative urinalysis does not rule out a UTI.

Recommendation 5

Diagnosis of UTI requires a culture of the urine (strength of evidence: strong).

II. TREATMENT

Recommendation 6

If the infant or young child 2 months to 2 years of age with suspected UTI is assessed as toxic, dehydrated, or unable to retain oral intake, initial antimicrobial therapy should be administered parenterally and hospitalization should be considered (strength of evidence: opinion/consensus).

Recommendation 7

In the infant or young child 2 months to 2 years of age who may not appear ill but who has a culture confirming the presence of UTI, antimicrobial therapy should be initiated, parenterally or orally (strength of evidence: good).

Recommendation 8

Infants and young children 2 months to 2 years of age with UTI who have not had the expected clinical response with 2 days of antimicrobial therapy should be reevaluated and another urine specimen should be cultured (strength of evidence: good).

Recommendation 9

Infants and young children 2 months to 2 years of age, including those whose treatment initially was administered parenterally, should complete a 7- to 14-day antimicrobial course orally (strength of evidence: strong).

Recommendation 10

After a 7- to 14-day course of antimicrobial therapy and sterilization of the urine, infants and young children 2 months to 2 years of age with UTI should receive antimicrobials in therapeutic or prophylactic dosages until the imaging studies are completed (strength of evidence: good).

III. EVALUATION: IMAGING

Recommendation 11

Infants and young children 2 months to 2 years of age with UTI who do not demonstrate the expected clinical response within 2 days of antimicrobial therapy should undergo ultrasonography promptly. Voiding cystourethrography (VCUG) or radionuclide cystography (RNC) is strongly encouraged to be performed at the earliest convenient time. Infants and young children who have the expected response to antimicrobials should have a sonogram performed at the earliest convenient time; a VCUG or RNC is strongly encouraged (strength of evidence: fair).

CLINICAL ALGORITHM(S)

An algorithm is provided representing the strategies with the greatest benefit-risk characteristics.

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The recommendations were based primarily on the results of the decision analysis (which was constrained by data extracted from published reports) and, when necessary, consensus opinion.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

- Accurate diagnosis of urinary tract infection (UTI) in infants and young children is extremely important for two reasons: to permit identification, treatment, and evaluation of the children who are at risk for kidney damage and to avoid unnecessary treatment and evaluation of children who are not at risk, for whom interventions are costly and potentially harmful but provide no benefit.
- Effective treatment and prophylaxis of UTI may reduce the risk of recurrent UTI and progressive renal scarring, chronic hypertension and renal failure.

POTENTIAL HARMS

- Limited risks are associated with invasive methods to collect urine for urinalysis and culture. Suprapubic aspiration and transurethral catheterization require technical expertise and experience. The risk of introducing infection in infants by transurethral catheterization has not been determined precisely, but it is the consensus of the Subcommittee that the risk is sufficiently low to recommend the procedure when urinary tract infection (UTI) is suspected.
- Use of antimicrobials may be associated with side effects as well as the emergence of resistant bacterial strains.
- Exposure to radiation occurs with imaging studies.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

The recommendations in this statement do not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better

IOM DOMAIN

Effectiveness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

American Academy of Pediatrics (AAP). The diagnosis, treatment, and evaluation of the initial urinary tract infection in febrile infants and young children. Pediatrics 1999 Apr;103(4 Pt 1):843-52. [54 references] PubMed

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

1999 Apr 5

GUIDELINE DEVELOPER(S)

American Academy of Pediatrics - Medical Specialty Society

SOURCE(S) OF FUNDING

American Academy of Pediatrics

GUIDELINE COMMITTEE

Committee on Quality Improvement; Subcommittee on Urinary Tract Infection

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

The subcommittee was composed of pediatricians with expertise in the fields of epidemiology and informatics, infectious diseases, nephrology, pediatric practice, radiology, and urology.

Names of subcommittee members: Kenneth B. Roberts, MD, Chairperson; Stephen M. Downs, MD, MS; Stanley Hellerstein, MD; Michael J. Holmes, MD, PhD; Robert L. Lebowitz, MD; Jacob A. Lohr, MD; Linda D. Shortliffe, MD; Russell W. Steele, MD.

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

An update is not in progress at this time.

AAP Policies are reviewed every 3 years by the authoring body, at which time a recommendation is made that the policy be retired, revised, or reaffirmed without change. Until the Board of Directors approves a revision or reaffirmation, or retires a statement, the current policy remains in effect.

GUIDELINE AVAILABILITY

Electronic copies: Available from the American Academy of Pediatrics (AAP) Policy Web site.

Print copies: Available from AAP, 141 Northwest Point Blvd., P.O. Box 927, Elk Grove Village, IL 60009-0927.

AVAILABILITY OF COMPANION DOCUMENTS

The following is available:

- Technical report: urinary tract infections in febrile infants and young children. Pediatrics 1999 Apr;103(4):e54.

Electronic copies: Available from the American Academy of Pediatrics (AAP) Policy Web site.

Print copies: Available from AAP, 141 Northwest Point Blvd., P.O. Box 927, Elk Grove Village, IL 60009-0927.

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on April 27, 1999. The information was verified by the guideline developer on July 13, 1999.

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